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International Ocean Services Is It Time - Will It Ever Be Time?

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Considering the objectives of the Ocean Data Climate Workshop this week and trying to select a related, but not too technical subject, I decided to look at the services needed for ocean clients. I thought that it would make an interesting theme to consider how the acceptance of international ocean services is progressing over the years. Or is it? Are we closer to having a global observing system than we were twenty years ago? If so, what has changed between then and now? What is different between the efforts of twenty years or so ago to get the Integrated Global Ocean Stations System (IGOSS) off the ground and the present attempts to establish the Global Ocean Observing System (GOOS)? Is there a window of opportunity now that didn't exist then? If it doesn't happen now, a legitimate question could well be asked.... Will it ever happen?

At least on historical topics I am on firm ground, having been attending IOC meetings for many years, in fact, it was in 1970 that I attended my first IGOSS meeting and a couple of years later I started what was to become regular attendances at the IOC Governing Body sessions. Despite the numbing effect of sitting through IOC related meetings for a total of what must add up to two or three years, I can still defend the IOC as an essential intergovernmental body for the oceans. One can accept the value of medicine, but one doesn't have to enjoy the taste!

Looking back on the discussions taking place at earlier times, for example, when IGOSS was still in the pilot project phase, there were already strong advocates for ocean monitoring and ocean services, trying to convince governments of the benefits of a global approach to ocean services. Many of the arguments made then could be lifted straight out of the text and used today. As part of my preparations for tonight, I dug into the reports of the early IOC Assembly meetings, they make fascinating reading.

Although I was looking mainly for references related to the development of ocean service products, I couldn't resist noting some of the more general items that evoked a "then and now" response, either because things had changed dramatically or not at all.

Right from the report from the first ever session of the IOC in 1961, some problems never seem to go away. One resolution noted the shortage of experts in marine sciences, which.... "may well delay the development of these sciences for many years". Another resolution urged increased support to developing countries interested in participating in international oceanographic programs.

Some actions showed considerable foresight, a resolution on aids to navigation recommended..... "the active pursuit of satellite navigation". In fairness to history however, I should point out at that time, satellite navigation was qualified as a system of lesser accuracy in the context of plus or minus a quarter of a nautical mile in positioning.

As far as ocean observations were concerned, the Acting Director General of Unesco, in his opening address, stated that...."scientists felt more and more the need for numerous, detailed and systematic observations". A great deal of discussion was directed towards the exchange of data and the need to standardize methodology and formats.

The foundations for future global ocean observations were definitely laid at the first meeting. The first IOC Chairman was Anton Bruun, who unfortunately passed away later the same year. Also at that first session in 1961, the US delegation numbered 28 and China was represented by Taiwan. The need to concentrate research efforts on ocean circulation was mentioned as early as the next year, when one of the resolutions instructed..... "the Secretary to call special attention to Member States to the need for the quickest possible development of the technical means for the study of the oceanic circulation". The 1962 session was convinced of the importance to develop a comprehensive program for world ocean study as a framework under which national, regional and world-wide international programs for the ocean could be planned. Japan argued for speedy distribution and utilization of synoptic data, and a plea went out to fishing organizations for the systematic collection of ocean data on all fishing vessels.

It was in 1962, that SCOR was recognized as an advisory body to the IOC. That year, an IOC meeting in Washington recommended the acceptance and use of the metric system for ocean observations. The Commission took a breather in 1963 and met again in 1964. This meeting recognized the...."intimate relation between the atmosphere and ocean and the probable effect of global forces and events on the balance of heat and transport of water in the ocean. IGOSS was stirring, as the IOC, led by Jim Snodgrass of Scripps, discussed the need to allocate radio frequencies for ocean data use.

In 1964, in his welcoming address, the Director General of Unesco stated his intent to increase the IOC budget by 27%. France complained about the lack of translation for many of the meeting documents. In 1965 the Commission established a Working Group on Ocean-Atmosphere Interaction to cooperate with similar groups being set up by WMO, and the IUGG. The WG was to consider ways in which intergovernmental action could strengthen the forecasting of sea surface conditions and to facilitate the exploitation of marine food resources. Professor Matveyev, Assistant Director General for Science told the participants that the number of problems requiring international solutions was sure to increase and that, even if one day, the Commission succeeded in covering the whole ocean with a network of systematic observations, it would still have tasks to fulfill. The Integrated Global Ocean Station System, IGOSS, was established as an IOC

Working Group in 1967 at the Fifth Session. The Commission itself recommended a budget increase of 50%, to allow inter alia, the development with WMO, of synoptic ocean data systems. It also noted the need to coordinate the work of the various WGs on Data Exchange, Ocean Data Stations, Communications, Ocean Variability and Air-Sea Interactions, with a view to preparing the ground for the eventual establishment of synoptic ocean observation in the oceans.

By this time membership of the IOC had risen to 58 Member States and the number in the US delegation had fallen to fourteen delegates, plus six observers. Progress on the planning for IGOSS was reported to the Sixth Session of the IOC in 1969. Concurrently with this session, IGOSS and the WMO Panel on Meteorological Aspects of Ocean Affairs had its second joint meeting. The Commission adopted the General Plan and Implementation Program for IGOSS, Phase I. In so doing the resolution noted the connection between the call from the UN General Assembly for an expanded program of world-wide exploration of the oceans and the need for improved data collection and processing. The resolution also emphasized the need for more detailed studies on applications and user requirements. Therefore by the end of the sixties, IGOSS was established but not underway, links between the IOC and WMO had been set and the importance of global ocean observations had been recognized by oceanographers. Requirements and applications were not very well argued. In all, the situation was not too much different to the present except for the absence of the climate factor.

In 1971 the political bickering on representation continued. A resolution by the Executive Council of Unesco eventually resolved the China issue. It was at this session that the Commission decided to separate the IOC from the Office of Oceanography, and also started its preoccupation with its own Rules of Procedure, Statutes and Organization. The entry of the Commission into the seventies was also marked with a flurry of additions to the growing list of acronyms. GELTSPAP, the Group of Experts on the Long-term Scientific Policy and Planning made its report on LEPOR, the Long-term and Expanded Program of Oceanic Research. The International Decade of Ocean Exploration IDOE was adopted as part of the plan. ROSCOP was adopted, GIPME was established. The publication on International Marine Science was founded and the IOC also issued an inventory of "ODAS of the World". ODAS referring to Ocean data Acquisition Systems. In terms of ocean services, the Commission approved the Bathy Pilot Project and therefore launched IGOSS implementation, and decided that pollution monitoring was a responsibility of the IOC, however it couldn't decide on where to place that responsibility.

It was in 1973, during a discussion on GATE (GARP Atlantic Tropical Experiment and FGGE (First GARP Global Experiment) that "climate changes" appeared for the first time. Professor Kort of the USSR drew attention to the role of ocean currents in the meridional transfer of heat and "...the probable importance of this transfer to long-term weather forecasting and climate changes". Also in 1973, a workshop on El Niño was called for, IGOSS priorities were endorsed. On the political front Algeria objected to the presence of Portugal, South Africa and Rhodesia, the IOC input into the Law of the Sea took up much of the discussion,

the number of Member States to the IOC had risen to 76 and the US delegation had shrunk to 12.

By the mid-seventies ocean services under IGOSS had become respectable, if not as widely supported as one would have liked. The Bathy Pilot project became operational, several manuals and guides were published. The marine pollution (petroleum) monitoring project MAPMOP was implemented. FAO called on IGOSS to look to the provision of ocean services for the fisheries. South Africa narrowly survived a suspension of their participation at the end of the Assembly in 1975, only to be removed at the commencement of the tenth Assembly in 1977.

In 1977 the IOC was made aware of the growing issue of climate. A Joint SCOR/IOC Committee on Oceanography and Global Atmospheric Research Program, called COG and chaired by Henry Charnock, linked the importance of ocean circulation models to climate. The Assembly heard of the establishment of the World Climate Program, which went beyond GARP objectives and felt that the IOC should participate extensively in these activities as the oceanographic role became more evident. The annual number of BATHY/TESAC messages exchanged under IGOSS hit 35,000 in 1976. Codes were established to allow data from ocean buoys to be added to the observational network. IGOSS reviewed its support for GARP and climate activities. The IOC Committee for IGOSS was abandoned in favour of a Joint Working Committee with the WMO. Interest in ocean services was widely expressed, although participation of Member States remained limited.

By the end of the seventies, programmes identified as being "of fundamental concern to the Commission" included ocean climate and marine resources. One of the successes of the end of the decade was FGGE. WMO reported to the Commission that all the planned oceanographic programs during FGGE had been successfully completed. Of special mention was the drifting buoy program under IGOSS. During FGGE in 1979, 260 ships from 21 countries contributed to the 45,000 BATHY/TESAC reports received. 360 drifting buoys were deployed and their data coordinated through IGOSS. This demonstration of IGOSS usefulness marked a certain maturation and consolidation of ocean observation and services over the decade. The end of the seventies saw the establishment of the Joint IOC/SCOR Committee on Climate Change and the Ocean CCCO and the beginning of the planning for the World Ocean Circulation Experiment WOCE. The link between climate and ocean observations was cemented by Roger Revelle addressing the Assembly, as Chairman of CCCO. With typical clarity he outlined the future requirements. For ocean monitoring from the standpoint of climate, he stated there are four considerations to be borne in mind: data accuracy, data coverage, data timeliness and economy of data retrieval. Ocean pollution monitoring activities were transferred from IGOSS to GIPME.

So into the eighties. In 1982 the IOC Assembly preceded the opening of the Law of the Sea Convention by a few weeks. Climate had become a focus for many of the ocean science programmes. An action plan was presented by the CCCO for

an Ocean Observation System which called for the implementation of observation programmes tested and designed through the CCCO and operated by IGOSS. IGOSS changed its name to the Integrated Global Ocean Services System and began to accept delayed mode (up to 30 days) data. 1985 was the twenty fifth anniversary of the IOC, and the Ocean Processes and Climate committee met for the first time. Priorities for ocean observations were stated as sea level, ocean buoy developments and IGOSS sub-sea thermal measurements. IGOSS identified four accelerated thrusts - ocean observation system development, data products, real-time sea-level data and technological improvements. Despite much rhetoric and a universal acceptance of the importance of ocean data and services, the lack of global participation continued to plague the full realization of its potential. Member States of the IOC itself now numbered 112, and the reverse correlation with the size of the USA delegation, now at ten, continued.

At the 1987 Assembly, ocean observations received much, if somewhat fragmented, attention. Discussions took place under agenda items on Oceans Dynamics and Climate, IGOSS, Buoy Coordination Panel, Global Sea Level Observations, IODE, Ocean Processes and Climate, GIPME, JGOFS (which made its first appearance at the Assembly, future requirements for ocean monitoring and a number of other of issues dealing with regional and other international bodies. The eighties concluded with the Fifteenth Assembly in 1989. By this time the climate priority in ocean monitoring was completely established. Under the JSC/CCCO the Ocean Observing System Development Panel was formed to give the scientific direction to the design of an observing system for climate needs. On a broader front the Assembly approved the establishment of an ad hoc group of experts to look at the organizational side of monitoring networks. To say that global ocean services has been a slow starter would be an understatement. In many respects the situation at the start of the nineties has not changed significantly from that in the sixties. In my view there are two major differences:

- i) the appearance of climate change as an issue, together with its obvious need for improved quantity and quality ocean data is the most significant factor.
- ii) the other relates to technological improvements, which are continuing to ease the task of gathering and analyzing the observations. Remote sensing, automation and the development of new and sophisticated instruments, such as doppler radar current meters will increase the quantity and reliability of observations. Concurrently computer hardware and software development are making the access, quality control and interpretation of these data more effective and economical.

The rationale for global ocean services as an aid to coastal development, fisheries, marine pollution, transportation, safety and offshore operations remains unchanged from the sixties. Of course the demands from the climate factor is an added requirement. The framework has been established and the technologies have progressed remarkably, but the same issues remain. Why is it that the problems of participation, commitment and continuity persist? I would suggest that the following were to blame in the sixties and they are equally true today:

- the lack of a strong operational secretariat
- the absence of dependable operational funding
- the need for better demonstration of benefits

Firstly, the lack of a strong operational secretariat. An effective operational global observation system cannot be run with a couple of positions at the IOC and little additional support. Admittedly the implementation must rely on national efforts and budgets, but an active operational unit is needed to solve issues in real-time, induce countries to meet commitments and deadlines and to give advice on all aspects of the system on a daily basis.

Over the eighties there seemed to be a fragmentation of the services sector within the Commission with programs on climate, GOOS, IGOSS, GLOSS, Drifting Buoys, IODE, ITSU and even pollution monitoring all on parallel but separate tracks. At the same time it was clear that programs of data management under the real-time IGOSS and the non-real-time IODE were converging. I feel that the IOC would be more effective in the area of ocean observation and services if it would consolidate the relevant programs. Although data and information from research programs must continue to be a part of an effective observational system, it cannot rely on the availability and direction of research programs alone if it is to survive, which brings me to the second obstacle - the absence of operational funding.

Government funding for operational systems needs to be consistent and dependable and therefore be separated from research projects, which tend to be variable and finite. With a see-saw of budgets and priorities it is difficult to maintain program momentum.

Can we convince our respective governments to put ocean observations on a regular and priority footing? I believe the answer is yes, but it won't be an easy sell. We must be able to explain.... what is to be done.....why we must do it.... and what are the expected results and benefits, all in words that an intelligent but possibly non-scientific person can understand.

Governments must also understand the benefits of ocean observation and services. One answer may be to look to demonstration projects and applications research. The Pacific TOGA has set a standard by planning the transition from research to operation. Many of the governments directly affected by the El Niño are already fully convinced of the need for predictions. I would guess a TOGA in the Indian Ocean would prove to be equally rewarding. The same reasoning could be applied to other areas such as fisheries or coastal zone management. I am sure projects exist or could be implemented that could serve as demonstration of benefits for similar problems in other areas. About eighteen months ago, Canada hosted a Symposium on Operational Oceanography for Fisheries, the response was tremendous.

The oceans make up a large part of our world, it is unthinkable that mankind will be able to solve the economic and environmental crises facing society today without an adequate knowledge of the oceans. Waiting will mean the loss of valuable climatic data and an increase in costs and complexity. The ocean community should act now.

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Appendix IV

